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Philosophy and the New Physics. An Essay on the Relativity Theory and the Theory of Quanta. By LOUIS ROUGIER. Philadelphia, P. Blakiston's Son & Co., 1921. 12mo. 15 + 159 pp. Price \$1.75.

This work is an authorized translation by Dr. Morton Masius, professor of physics in the Worcester Polytechnic Institute, from the author's corrected text of "La matérialisation de l'énergie."

Translator's preface: "The recent remarkable developments of physical theories, especially those concerned with relativity and quanta of energy, cannot fail to have far-reaching influences on philosophical thought. Physicists, as a rule, are too much occupied with their special field to give much attention to matters of more general philosophical interest, and few philosophers possess the knowledge of science required for discussing and criticizing fruitfully the work of the physicist. Professor Rougier's very wide reading in mathematical and experimental physics has enabled him to present and interpret the new advances in Physics in a way which should prove of great interest to both philosopher and physicist. This book seems to mark a measurable advance toward a confluence of the broad streams of philosophical and scientific enquiry."

Contents—Chapter I: "The dualism of matter and energy," pages 1-21; II: "Mass and the relativity principle," 22-40; III: "Electromagnetic dynamics," 41-56; IV: "The electronic theory of matter," 57-72; V: "The inertia of energy," 73-90; VI: "The weight of energy," 91-109; VII: "The structure of energy," 110-147; VIII: "Conclusion," 148-153; Bibliography, 153-155; Index of names, 157-159.

Praktisches Zahlenrechnen. (Sammlung Götschen no. 405.) By P. WERKMEISTER.

Berlin and Leipzig, Vereinigung Wissenschaftlicher Verleger, 1921. 16mo. 135 pp. Price 4.20 marks.

This new volume of an admirable series is bound in flexible but durable paper covers instead of stiff cloth covers used before the war. It surveys the elementary parts of a field not over familiar to American mathematicians, introducing a number of historical notes and references to the literature of the subject. The main headings of the contents are as follows—Section I: Calculation without special aids [(a) Exact calculation; (b) Approximate calculation], 9-41; II: Calculation with the aid of tables [(a) Exact calculation with the aid of numerical tables—multiplication or product, quarter square, etc.; (b) Approximate calculation with the aid of numerical and graphical tables—logarithmic, of squares and square roots, etc.], 41-60; III: Calculation with the use of mechanical aids [(a) Exact calculations—with calculating machines; (b) Approximate calculations—by means of slide rules], 60-91; IV: Graphical calculation [(a) Treatment of fundamental operations; (b) Solution of equations; (c) Differentiation and integration; (d) Calculation of errors], 91-133; Subject index, 134-135.

Three Lectures on Fermat's Last Theorem. By L. J. MORDELL. Cambridge, at the University Press, 1921. 8vo. Pamphlet, 3 + 31 pages. Price 4s.

This booklet contains lectures in practically the form in which they were delivered at Birkbeck College, London, in March, 1920. It also contains a few details omitted from the lectures. For full references on the subject the reader is referred to L. E. Dickson's "very useful paper," "Fermat's last theorem," in *Annals of Mathematics*, vol. 18, 1917, and to volume 2 of his *History of the Theory of Numbers*.

The first chapter is entitled "Statement of the theorem" and contains subheadings "Did Fermat prove his theorem?" "Analysis of another statement of Fermat," "A simplification of the problem," "The equation $x^2 + y^2 = z^2$," "The equation $x^4 + y^4 = z^4$," "The equation $x^3 + y^3 = z^3$," "The equation $x^5 + y^5 = z^5$ and $x^7 + y^7 = z^7$." The second chapter (pages 10-26) considers Kummer's work and its consequences. The brief third chapter entitled "Libri's result" has as subheadings "Sophie Germain's result" and "Wendt's form of the result."

Some Investigations in the Theory of Map Projections. By A. E. YOUNG. (R. G. S. Technical Series, no. 1.) London, Royal Geographical Society, 1920. 8 + 76 pages. 8vo. Price 6 shillings.

These exhaustive investigations are concerned mostly with the minimum error projections

invented by Airy and Clarke. Their results are extended and simplified "so that, out of the almost bewildering number of projections that have been discovered and advocated from time to time, those which are practically the best or most useful are reduced to comparatively few, the application of which has been simplified."

The first chapter (pages 1-21) deals with the minimum error zenithal projections, the second (pages 22-56) with the minimum error conical projections, the third (pages 57-65) with the conical orthomorphic projection with two standard parallels (Lambert's second) for the spheroid, the fourth (pages 66-68) with the polyconic projections, the fifth (pages 69-72) with finite errors of projections, and the sixth with the convergency of meridians. Mr. Young's survey has shown the worth of some old projections "which seem to have been hit upon by their inventors by a sort of geometrical intuition rather than by rigorous analysis." An example of this is Murdoch's remarkable third projection, dating back to 1758, and yet "the very best of the conical class." A discussion of G. W. Hill's conical projection (*Annals of Mathematics*, 1908) leads to the conclusion that it does not appear to have "any advantage over those we have investigated and it is certainly more difficult to compute."

The work is thoroughly mathematical and constitutes a most valuable contribution to the subject. It may be of interest to note in conclusion certain expansions of use in discussions of this kind: $\sin \theta$, $\cos \theta$, $\tan \theta$, $\cot \theta$, $\sec \theta$, $\operatorname{cosec} \theta$, $\sin^{-1} \theta$, $\tan^{-1} \theta$, $\log_e \sin \theta$, $\log_e \cos \theta$, $\log_e \tan \theta$, $\log_e (1 + \theta)$, $\log_e (1 - \theta)$, $\log_e [(1 + \theta)/(1 - \theta)]$ and $\tan (\theta + h)$ as a power series in h with coefficients powers of $\tan \theta$. Most of the expansions are to the eighth or ninth degree in θ .

Edinburgh's Place in Scientific Progress. Prepared for the Edinburgh Meeting of the British Association [1921]. Edinburgh and London, W. & R. Chambers, 1921. 12mo. 16 + 263 pages. Price 6 shillings.

This very interesting volume, with a preface by C. G. KNOTT, contains brief sketches on 25 topics by 23 different authors. "Mathematics and natural philosophy" is treated by C. G. KNOTT, pages 1-30; "Astronomy" by R. A. SAMPSON, 31-32; "Actuarial Science" by A. E. SPRAGUE, 33-35; "Meteorology" by A. WATT, 36-43; and "Engineering" by T. H. BEARE. Eight portraits are inserted in the volume, and the frontispiece in colors is of John Napier of Merchiston.

Among the numerous names occurring in Doctor Knott's sketch are the following: John Napier, James Gregory, David Gregory, Colin Maclaurin, James Stirling, James Ivory, John Playfair, John Leslie, William Wallace, Philip Kelland, D. F. Gregory, George Chrystal and P. G. Tait. It is stated that "in the light of accurate history" Napier "stands preëminent as the first great scientific Scotsman."

Mathematik in der Natur. By H. EMCH. Zürich, Rascher & Cie., 1921. 12mo. 86 pages. Price, paper cover, 2 francs.

This little volume was distributed free to subscribers of *Natur und Technik*, with Heft 12 of Jahrgang 1920-21. The eight chapters have the titles: Geometry in plant and animal bodies; Concerning architecture with the smallest building stones of the world; Where power to comprehend and to visualize is lacking, there mathematics always helps further; Mathematical fundamental problems of mechanics in nature; Number in plant and animal bodies; Cells, molecules, atoms, electrons. We here find brief references, in popular manner, to matters treated, for the most part, by D'Arcy W. Thompson, in his *On Growth and Form*, 1917, in more scholarly fashion. (Compare this MONTHLY, 1918, 189-193, 232-238, where logarithmic spiral forms, golden section, and Fibonacci series are discussed; see also 1920, 314.)

Grundzüge der Einsteinschen Relativitätstheorie. By AUGUST KOPFF. Leipzig, S. Hirzel, 1921. 8vo. 4 + 198 pages. Price, bound, 42.50 marks.

This introduction to the Einstein theory of relativity was developed from lectures, delivered in the winter semester of 1919-20 and in the summer semester of 1920, at the University of Heidelberg, where Dr. Kopff is extraordinary professor of astronomy. "It aims," the author states in the preface, "in the simplest possible way again to set forth the fundamental investigations of this theory, in connection with which a mathematical presentation can not be avoided. Without deep penetration into the mathematical problem of the theory of relativity, one can never really